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fibres of neighboring cells are continuous; as, indeed, recent studies in the continuity of protoplasm seem to show. The entire idioplasm of the body is then one immense *reticulum*, and a higher organism is thus related to the outside world as a cell on a larger scale. Any disturbance of the idioplasm at one point is transmitted to distant points. Thus the idioplasm preserves a uniform structure so that all cross sections are similar. But the fibre itself is supposed to be composed of rows of units termed *micellae*. The micellae are alike in a single row, and grow and reproduce in a longitudinal direction only. But different rows are unlike; and the peculiar characteristics of an organism depend on the particular structure which a cross section represents. Furthermore, not all the micellae of the cross section are active at once, but certain layers of them act, and in turn stimulate more internal or external layers to activity, and in this way the orderly succession of the cyclic development of ontogeny may be accounted for. All this has been upset by recent discoveries concerning the cell nucleus. In sexual reproduction the characters of the father appear equally transmitted with those of the mother. These characters are therefore contained in the spermatozoon.

*Beiträge zur Kenntniss der Bildung, Befruchtung und Theilung des thierischen Eies.* O. HERTWIG. Leipzig, 1876.

Hertwig has shown that the union of sperm cell and egg cell known as fertilization or fecundation, consists essentially in the fusion of two similar nuclei (male and female pronuclei), sometimes the tail of the spermatozoon not even entering the egg. Studies of the production of the spermatozoon (*spermatogenesis*) show that cells (quite similar to those that in the female reproductive organs become ova by growth) in the male reproductive organs after repeated divisions become spermatozoa by direct transformation of the cell protoplasm to serve locomotive purposes, the nucleus remaining in the "head" of the spermatozoon. Kölliker, however, derives the entire body of the spermatozoon from the nucleus. It is certain that a large part of the cell protoplasm is lost, and only that immediately surrounding the nucleus is utilized in the maturation of the male element in the highest animals.

*Neue Untersuchungen über den Befruchtungsvorgang bei den Phanerogamen als Grundlage für eine Theorie der Zeugung.* STRASBURGER. Jena, 1884.

This observer has shown that in the tube of the pollen grain, when it has sprouted upon the stigma of a flower, a nucleus ("generative nucleus") wanders down and seeks the nucleus of the germ cell of the ovary.

Gruber, and others in studying the sexual unions of the unicellular animals, have shown that there is a dividing up of the nucleus, and in reciprocal fertilization (*conjugation*, or copulation of *ciliata*), there is a mutual interchange of nuclear material; while in *zygotic fertilization* (similar to the union of ovum and spermatozoon) there is a union of the nuclei to form one nucleus.

*Bericht der Naturforschenden Gesellschaft zu Freiburg.* Vol. 1, 1886. GRUBER.

Gruber has found that by cutting up stentors, the fragments became regenerated to complete stentors whenever a portion of the nucleus was retained in the segment cut off. This experiment proved definitely that the power of assimilation rests with the nucleus, or at least the nucleus has a necessary control. We may also conclude that the nucleus is not a definite structure like the idioplasm of Nägeli, but is an aggregation of gemmules that are alike; each of which can reproduce itself *ad lib*.